

WHAT IS CLAIMED IS:

1. A pattern inspection apparatus comprising:
  - imaging optics which forms an optical image of  
a pattern formed on a plate to be inspected based on  
5 designed pattern data;
  - a detected pattern data generator which detects  
the optical image to generate detected pattern data;
  - a reference pattern data generator which generates  
first reference pattern data regarding the detected  
10 pattern data from the designed pattern data;
  - a first comparator which compares the detected  
pattern data with the first reference pattern data to  
detect a defect of the pattern formed on the plate;
  - a first memory which, when there are a plurality  
15 of repeated pattern areas on the plate, stores pattern  
data obtained by detecting an inspection area, which is  
one of the plurality of repeated pattern areas, as  
second reference pattern data;
  - a second comparator which compares the detected  
20 pattern data with the second reference pattern data to  
detect the defect of the pattern formed on the plate;  
and
  - a computer which reads an arrangement, a number,  
a dimension and a repeated pitch of the plurality of  
25 repeated pattern areas from the designed pattern data,  
and stores the inspection area as a basis of the second  
reference pattern data.

2. The pattern inspection apparatus according to claim 1, wherein the computer detects presence of the plurality of repeated pattern areas from layout information contained in the designed pattern data, and  
5 reads the arrangement, the number, the dimension and the repeated pitch of the plurality of the repeated pattern areas.

3. The pattern inspection apparatus according to claim 1, wherein the computer defines a fixed pattern  
10 range as a cell from description of the designed pattern data, detects start positions and finish positions of a plurality of repeated cells from repeated description of the cell, and reads  
an arrangement, a number, a dimension and a repeated  
15 pitch of the plurality of repeated cells.

4. The pattern inspection apparatus according to claim 1, wherein the computer saves the designed pattern data as an image, extracts a repeated feature by pattern matching to detect presence of a plurality  
20 of repeated subchips in one chip, and reads an arrangement, a number, a dimension and a repeated pitch of the plurality of repeated subchips.

5. The pattern inspection apparatus according to claim 1, wherein comparison is carried out for the same  
25 detected pattern area by using both of the first and second comparators.

6. The pattern inspection apparatus according to

claim 1, wherein detected pattern data of a first detected area generated by the detected pattern data generator is sent to the first comparator and the first memory,

5           the first comparator compares the detected pattern data of the first detected area with reference pattern data of the first detected area generated by the reference pattern data generator regarding the detected pattern data,

10           detected pattern data of a second detected area generated by the detected pattern data generator after the detected pattern data of the first detected area is sent to the first and second comparators,

          the first comparator compares the detected pattern  
15       data of the second detected area with reference pattern data of the second detected area generated by the reference pattern data generator regarding the detected pattern data, and

          the second comparator compares the detected  
20       pattern data of the second detected area with the detected pattern data of the first detected area stored in the first memory.

          7. The pattern inspection apparatus according to  
claim 6, wherein detected pattern data of a third  
25       detected area generated by the detected pattern data generator after the detected pattern data of the second detected area is sent to the first and second

comparators,

the first comparator compares the detected pattern data of the third detected area with reference pattern data of the third detected area generated by the  
5 reference pattern data generator regarding the detected pattern data, and

the second comparator compares the detected pattern data of the third detected area with the detected pattern data of the first detected area stored  
10 in the first memory.

8. The pattern inspection apparatus according to claim 1, wherein the reference pattern data generator has a second memory,

the detected pattern data of the first and second  
15 detected areas generated by the detected pattern data generator are sent to the first and second memories,

the first comparator compares the detected pattern data of the first and second detected areas with the reference pattern data of the first and second detected  
20 areas generated by the reference pattern data generator, and

the second comparator compares the detected pattern data of the first and second detected areas stored in the first memory with each other.

25 9. A pattern inspection apparatus comprising:

imaging optics which forms an optical image of a pattern formed on a plate to be inspected based on

designed pattern data;

a detected pattern data generator which detects the optical image to generate detected pattern data;

5 a reference pattern data generator which generates first reference pattern data regarding the detected pattern data from the designed pattern data;

a first comparator which compares the detected pattern data with the first reference pattern data to detect a defect of the pattern formed on the plate;

10 a first memory which, when there are a plurality of repeated pattern areas on the plate, stores pattern data obtained by detecting an inspection area, which is one of the plurality of repeated pattern areas, as second reference pattern data;

15 a second comparator which compares the detected pattern data with the second reference pattern data to detect the defect of the pattern formed on the plate; and

20 a computer which reads an arrangement, a number, a dimension and a repeated pitch of the plurality of repeated pattern areas from the detected pattern data within an arbitrary range, and stores the inspection area as a basis of the second reference pattern data.

25 10. The pattern inspection apparatus according to claim 9, wherein the computer fetches and stores the detected pattern data of one stripe at an arbitrary position on the plate, extracts a repeated feature of

the detected pattern data of one stripe to detect  
presence of a plurality of repeated subchips in one  
chip, and reads an arrangement, a number, a dimension  
and a repeated pitch of the plurality of the repeated  
5 subchips.

11. The pattern inspection apparatus according to  
claim 9, wherein the computer fetches and stores the  
detected pattern data of one stripe at an arbitrary  
position on the plate, extracts a repeated feature of  
10 the detected pattern data of one stripe to detect  
formation of a plurality of cells in one chip, and  
reads the arrangement, the number, the dimension and  
the repeated pitch of the plurality of repeated cells.

12. The pattern inspection apparatus according to  
15 claim 9, wherein comparison is carried out for the same  
detected pattern area by using both of the first and  
second comparators.

13. The pattern inspection apparatus according to  
claim 9, wherein detected pattern data of a first  
20 detected area generated by the detected pattern data  
generator is sent to the first comparator and the first  
memory,

the first comparator compares the detected pattern  
data of the first detected area with reference pattern  
25 data of the first detected area generated by the  
reference pattern data generator regarding the detected  
pattern data,

detected pattern data of a second detected area generated by the detected pattern data generator after the detected pattern data of the first detected area is sent to the first and second comparators,

5           the first comparator compares the detected pattern data of the second detected area with reference pattern data of the second detected area generated by the reference pattern data generator regarding the detected pattern data, and

10           the second comparator compares the detected pattern data of the second detected area with the detected pattern data of the first detected area stored in the first memory.

14.   The pattern inspection apparatus according to  
15       claim 13, wherein detected pattern data of a third detected area generated by the detected pattern data generator after the detected pattern data of the second detected area is sent to the first and second comparators,

20           the first comparator compares the detected pattern data of the third detected area with reference pattern data of the third detected area generated by the reference pattern data generator regarding the detected pattern data, and

25           the second comparator compares the detected pattern data of the third detected area with the detected pattern data of the first detected area stored

in the first memory.

15. The pattern inspection apparatus according to claim 11, wherein the reference pattern data generator has a second memory,

5           the detected pattern data of the first and second detected areas generated by the detected pattern data generator are sent to the first and second memories,

          the first comparator compares the detected pattern data of the first and second detected areas with the  
10       reference pattern data of the first and second detected areas generated by the reference pattern data generator, and

          the second comparator compares the detected pattern data of the first and second detected areas  
15       stored in the first memory with each other.